

MICHAEL D VERSHININ, PhD -- BIOGRAPHICAL SKETCH

Assistant Professor of Physics

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Education History

Cooper Union	Engineering	B.S., 1997
University of Illinois	Physics	M.S., 1999
University of Illinois	Physics	Ph.D., 2004
University of California, Irvine	Biophysics	Postdoc, 2005-2009

Employment/training history

4/10-present	Adjunct Assistant Professor of Biology	University of Utah
1/10-present	Member of Center for Cell & Genome Science	University of Utah
1/10-present	Assistant Professor of Physics & Astronomy	University of Utah
1/05-12/09	Postdoctoral Researcher	University of California Irvine
1/98-12/04	Graduate Research Assistant	University of Illinois Urbana-Champaign

Publications

A. Atemin, A. Ivanova, R. Stamatov, S. Uzunova, **M.D. Vershinin**, S. Saffarian, S.S. Stoyanov, "Single virus-like particles tracking reveals the kinetics of SARS-Cov-2 infectivity", *in preparation*

Q. Li, J.T. Ferrare, J. Silver, J.O. Wilson, L. Arteaga-Castaneda, W. Qiu, **M. Vershinin**, S.J. King, K.C. Neuman, J. Xu, "Cholesterol in the cargo membrane reduces kinesin-1 binding to microtubules in the presence of tau", *PNAS* 120(3):e2212507120 (2023)

I. Saha, B. Preece, A. Peterson, H. Durden, B. MacArthur, J. Lowe, D. Belnap, **M. Vershinin** and S. Saffarian, "Gag-Gag interactions are insufficient to fully stabilize and order the immature HIV Gag lattice", *Viruses* 13:1946 (2021)

A. Sharma; B. Preece; X. Fan; R.J. McKenney; K.M. Ori-McKenney; S. Saffarian, **M. Vershinin**, "Structural stability of SARS-CoV-2 virus like particles degrades with temperature", *Biochem Biophys Res Commun.* 534 :343-346 (2020)

H. Swann*, A. Sharma*, B. Preece, A. Peterson, C. Eldridge, D.M. Belnap, **M. Vershinin**, S. Saffarian, "Minimal system for assembly of SARS-CoV-2 virus like particles", *Sci. Rep.* 10 :21877 (2020) *co-primary authors

A. Sharma, **M.D. Vershinin**, "Length dependence of the rigidity of microtubules in small networks", *Biochem Biophys Res Commun.* 529 :303-305 (2020)

F. Doval, K. Chiba, R.J. McKenney, K.M. Ori-McKenney, **M.D. Vershinin**, "Temperature-dependent activity of kinesins is regulable", *Biochem Biophys Res Commun.* 528 :528-530 (2020)

H.C. Nguyen, N. Talledge, J. McCullough, A. Sharma, F.R. Moss III, J.H. Iwasa, **M.D. Vershinin**, W.I. Sundquist, A. Frost "Membrane constriction and thinning by sequential ESCRT-III polymerization", *Nat Struct Mol Biol* 27 :392-399 (2020)

J. Scherer, I.B. Hogue, Z.A. Yaffe, N.S. Tanneti, B.Y. Winer, **M. Vershinin**, L.W. Enquist, "A Kinesin-3 Recruitment Complex Facilitates Axonal Sorting of Enveloped Alpha Herpesvirus Capsids", *PLOS Pathogens* 16(1):e1007985 (2020)

R. Tan, A. Lam, T. Tan, J. Han, D.W. Nowakowski, **M. Vershinin**, S. Simo, K.M. Ori-McKenney, R.J. McKenney, "Kinetically distinct phases of tau on microtubules regulate kinesin motors and severing enzymes", *Nat Cell Biol.* 21(9):1078-1085 (2019)

O. Osunbayo, C.E. Miles, F. Doval, B.J.N. Reddy, J.P. Keener, **M.D. Vershinin**, "Complex nearly immotile behaviour of enzymatically driven cargos", *Soft Matter* 15(8):1847-1852 (2019)

J.P. Bergman, M.J. Bovyn, F. Doval, A. Sharma, M.V. Gudheti, S.P. Gross, J.F. Allard, **M. Vershinin**, "Cargo navigation across 3D microtubule intersections", *Proc Natl Acad Sci U S A.* 115(3):537-542 (2018)

K. Chase, F. Doval, **M. Vershinin**, "Enhanced stability of kinesin-1 as a function of temperature", *Biochem Biophys Res Commun.* 493(3):1318-1321 (2017)

Babu J.N. Reddy, S. Tripathy, **M. Vershinin**, M. Tanenbaum, J. Xu, M. Mattson-Hoss, K. Arabi, D. Chapman, T. Doolin, C. Hyeon, S. Gross, "Heterogeneity in Kinesin function", *Traffic* 18(10):658-671 (2017)

P.A. Gutierrez, B.E. Ackermann, **M. Vershinin**, R.J. McKenney, "Differential effects of the dynein-regulatory factor Lissencephaly-1 on processive dynein-dynactin motility", *J Biol Chem.* 292(29):12245-12255 (2017)

J. Bergman, F. Doval, **M. Vershinin**, "Artificial microtubule cytoskeleton construction, manipulation, and modeling via holographic trapping of network nodes", *Proc. SPIE 9930, Biosensing and Nanomedicine IX*, 993005 (2016)

W. Hong, A. Takshak, O. Osunbayo, A. Kunwar, **M. Vershinin**, "The effect of temperature on microtubule-based molecular motor transport", *Biophys J.* 111:1287-94 (2016)

J. Scherer, Z. Yaffe, **M. Vershinin**, L. Enquist, "Dual-color Herpesvirus Capsids Discriminate Inoculum from Progeny", *J Virol.*, pii: JVI.01122-16 (2016)*

*Journal cover article

M. Vershinin, J. Bergman, F. Doval, "Custom complex 3D microtubule networks for experimentation and engineering", 26 August 2016, SPIE Newsroom. DOI: 10.1117/2.1201608.006690

J. Bergman, O. Osunbayo, **M. Vershinin**, "Constructing 3D microtubule networks using holographic optical trapping", *Sci Rep.* 5:18085 (2015)

O. Osunbayo, J. Butterfield, J. Bergman, L. Mershon, V. Rodionov, **M. Vershinin**, "Cargo Transport at Microtubule Crossings: Evidence for Prolonged Tug-of-War between Kinesin Motors", *Biophys J.* 108:1480-3 (2015)

T.E. Smith†, W. Hong†, M.M. Zachariah, M.K. Harper, T.K. Maitainaho, R.M. Van Wagoner, C.M. Ireland‡, **M. Vershinin**‡, “Single Molecule Inhibition of Human Kinesin 5A by Adociasulfates-13 and -14 from the Sponge *Cladocroce aculeate*”, *Proc Natl Acad Sci U S A* 110:18880-5 (2013). †Co-primary authors, ‡Co-senior authors

J. Butterfield, W. Hong, L. Mershon, **M. Vershinin**, “Construction of a high resolution microscope with conventional and holographic optical trapping capabilities”, *J Vis Exp*. 74 (2013)

J.Y. Yi, K. Ori-McKenney, R.J. McKenney, **M. Vershinin**, S.P. Gross, R.B. Vallee, “High-resolution imaging reveals indirect coordination of opposite motors and a role for LIS1 in high-load axonal transport”, *J Cell Biol*. 195:193-201 (2011)

A. Kunwar†, S.K. Tripathy†, J. Xu, M.K. Mattson, P. Anand, R. Sigua, **M. Vershinin**, R.J. McKenney, C.C. Yu, A. Mogilner‡, S.P. Gross‡ “Mechanical Stochastic Tug-of-war Models Cannot Explain Bi-directional Lipid droplet Transport”, *Proc Natl Acad Sci U S A*. 108:18960-5 (2011) †co-primary authors. ‡co-senior authors.

R.J. McKenney†, **M. Vershinin**†, A. Kunwar, R.B. Vallee‡, S.P. Gross‡, “LIS1 and NudE Induce a Persistent Dynein Force-Producing State”, *Cell* 141:304 (2010) †co-primary authors. ‡co-senior authors. *

*Journal cover article

K.H. Bremner, J. Scherer, J. Yi, **M. Vershinin**, S.P. Gross, R.B. Vallee, “Adenovirus transport via direct interaction of cytoplasmic dynein with the viral capsid hexon subunit”, *Cell Host Microbe* 6:523-35 (2009)

F. Ziebert, **M. Vershinin**, S.P. Gross, and I.S. Aranson, “Collective alignment of polar filaments by molecular motors”, *Eur. Phys. J. E* 28:401-9 (2009)

G.T. Shubeita†, S.L. Tran†, J. Xu, **M. Vershinin**, S. Cermelli, S.L. Cotton, M.A. Welte‡, S.P. Gross‡, “Kinesin-1–driven lipid droplets: Consequences of motor copy number for intracellular transport”, *Cell*, 135:1098-107 (2008). †co-primary authors. ‡co-senior authors.

A. Kunwar, **M. Vershinin**, J. Xu, S.P. Gross, “Stepping, Strain Gating, and an Unexpected Force-Velocity Curve for Multiple-Motor-Based Transport”, *Curr Biol*. 18:1173-83 (2008)

M. Vershinin†, J. Xu†, D.S. Razafsky, S.J. King, S.P. Gross, “Tuning microtubule-based transport via filamentous MAPs: the problem of dynein”, *Traffic* 9:882-92 (2008). †co-primary authors

B.C. Carter, **M. Vershinin**, S.P. Gross, “A comparison of step-detection methods: how well can you do?”, *Biophys. J*. 94:306-19 (2008)

S.P. Gross, **M. Vershinin**, G.T. Shubeita, “Cargo transport: two motors are sometimes better than one”, *Curr Biol*. 17: R478-R486 (2007)

D.Y. Petrov, R. Mallik, G.T. Shubeita, **M. Vershinin**, S.P. Gross, C.C. Yu, “Studying molecular motor-based cargo transport: what is real, and what is noise?”, *Biophys J*. 92 : 2953-63 (2007)

J.E. Martinez, **M.D. Vershinin**, G.T. Shubeita, S.P. Gross, "On the use of in vivo cargo velocity as a biophysical marker", Biochem Biophys Res Commun. 353 : 835-40 (2007)

M. Vershinin, B.C. Carter, D.S. Razafsky, S.J. King and S.P. Gross, "Multiple-motor based transport and its regulation by Tau", Proc Natl Acad Sci USA, 104 : 87-92 (2007) [track 2]

M. Vershinin, S. Misra, S. Ono, Y. Abe, Y. Ando, A. Yazdani, "Local ordering in the pseudogap state of the high-Tc superconductor Bi₂Sr₂CaCu₂O₈+□", Science 303 : 1995-1998 (2004)

M. Vershinin, S. Misra, Y. Abe, S. Ono, Y. Ando, A. Yazdani, "Electronic standing waves on the surface of Bi₂Sr₂CaCu₂O₈+□", Physica C: Superconductivity 408-410 : 764-767 (2004)

S. Misra, **M. Vershinin**, P. Phillips, A. Yazdani, "Failure of scattering interference in the pseudogap state of cuprate superconductors", Phys. Rev. B 70 : 220503 (2004)

Invited talks

December 2022 **Colloquium**
National Central University (Taiwan)

December 2021 **Colloquium**
Augusta University

October 2021 **Virtual Invited Conference Talk**
APS 4 Corners Conference

April 2021 **Workshop on Atomic Precision, Characterization & Devices**
Sandia National Labs (virtual)

March 2021 **Virtual Colloquium**
Idaho State University

December 2020 **Virtual Invited Series**
Motors in Quarantine

September 2020 **Virtual Colloquium**
Seton Hall University

March 2020 **Virtual Focus Session U20 Co-chair***
American Physical Society
*Session held online due to COVID-19 concerns

~~March 2020~~ **Panel Discussion on wiki.edu***
American Physical Society
*Session cancelled due to COVID-19 concerns

February 2020 **Conference Talk**
SCMB workshop
Tulane University, New Orleans, LA

March 2019 **Invited talk**
National Institutes of Health

March 2019 **Conference Talk**
American Physical Society

December 2018 **Conference Talk**
American Society for Cell Biology

September 2018 **Invited talk**
Weber State University

March 2017 **Invited talk**
Joint Virology Interest Group
Princeton University

February 2017 **Colloquium**
Auburn University

January 2017 **Colloquium**
University of Central Florida

December 2016 **Colloquium**
Tata Institute for Fundamental Research (India)

December 2016 **International symposium talk**
IIT Bombay (India)

November 2016 **Colloquium**
Department of Physiology & Developmental Biology
Brigham Young University

August 2016 **Conference talk** (Also service as session chair)
SPIE Optics and Photonics, San Diego, CA
Biosensing and Nanomedicine-IX section

April 2016 **Seminar**
New York University, Abu Dhabi, UAE

March 2016 **Conference talk**
Biophysical Society Annual Meeting, Los Angeles, CA

December 2015 **Microsymposium Talk**
American Society of Cell Biology annual meeting, San Diego, CA

October 2015 **Colloquium**
Seton Hall University, South Orange, NJ

October 2015 **Colloquium**
Idaho State University, Pocatello, ID

October 2015 **Colloquium**

University of California, Irvine, CA

- October 2015 **Conference talk** (Also service as session chair)
APS 4 Corners Conference, Tempe, AZ
- May 2013 **Public Presentation**
Discovery Gateway Center, Salt Lake City, UT
- October 2012 **Colloquium**
University of California, Merced, CA
- July 2011 **Conference talk**
Korean Institute of Advanced Science Conference on Subcellular Dynamics, Seoul, Korea
- August 2010 **Seminar**
University of Utah, Department of Biology
- May 2010 **Seminar**
University of Utah, Department of Physics and Astronomy
- March 2009 **Conference talk**
Annual Meeting of Biophysical Society, Boston
- December 2008 **Conference talk**
Annual Meeting of American Society for Cell Biology, San Francisco
- May 2008 **Colloquium**
California State University, Los Angeles
- January 2007 **Seminar**
University of Georgia Athens
- December 2005 **Conference talk**
Annual Meeting of American Society for Cell Biology, San Francisco
- February 2005 **Seminar**
University of California, Irvine
- November 2004 **Conference talk**
International Symposium on Superconductivity Science & Technology, Niigata, Japan

Synergistic activities

Ad hoc reviewer for multiple journals, including Nature Physics, PNAS, Biophysical Journal, and Traffic among others
Editorial board member of Scientific Reports (Nature Publishing Group)
Editor and Member of Product Advisory Board, Journal of Visualized Experiments
Member of Tau Beta Pi engineering honor society
Member of Sigma Xi scientific research honor society